

Dkt No. 2024736-7015112001
(266/083)

REMARKS

Claims 1-38 are pending in this application and subject to Examination. In the Office Action dated August 25, 2005, Claims 1 and 17 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,844,140 to Seale (hereinafter "Seale"). Claims 2-16, 18-31, and 33-38 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Seale, in view of U.S. Patent No. 6,042,556 to Beach et al. (hereinafter "Beach") and U.S. Patent No. 4,958,639 to Uchiyama et al. (hereinafter "Uchiyama"). Claim 32 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Seale, in view of Beach and Uchiyama, and further in view of U.S. Patent No. 5,485,839 to Aida et al. (hereinafter "Aida"). This rejection is respectfully traversed, as follows.

Regarding claim 1, Seale teaches a servo system for directing the operation of an ultrasound beam. The system includes a rotor and stator combination that utilizes electromagnetic forces to move the ultrasound beam in translational and rotational directions. As described in col. 5, lines 14-28, in a tracking modality, a time-varying parameter such as flow velocity is to be determined in a situation where target and/or sensor position and orientation vary over time, demanding dynamic correction of the ultrasound beam path. For example, the sensor may move on a stretchy skin surface and be easily bumped. Small-perturbation dither of the beam path is used to determine a direction for corrective alignment toward improved signal location. Scanning for target locations can be followed by dynamic tracking of the target.

As described in Seale col. 14, line 12 - col. 16, line 55, a rotor can carry either 1) an ultrasound transducer or transducer array that translates and rotates with the motor, or 2) an ultrasound-mirroring region whose changing position and angle alter the beam path. Rotational alignment of the rotor will directly control beam alignment, while translation of the rotor perpendicular to the beam path will control beam position. For an outgoing ultrasound path, "beam" refers to the path of outgoing energy flux, while for returning ultrasound echoes, "beam" refers to the path of high receptive sensitivity in the ultrasound transducer.

In contrast, claim 1 of the present invention is directed to a method for sensing a disturbance in a transmission path of a converging ultrasound energy beam transmitted by a transducer in a focused ultrasound system. The method includes transmitting a burst of

Dkt No. 2024736-7015112001
(266/083)

ultrasound energy from the transducer, along the transmission path, to a focal zone. The method further includes detecting whether a reflected portion of the ultrasound energy burst is received at the transducer within a certain time period following transmission of the burst, wherein receipt within the time period indicates the reflected portion was reflected by a disturbance located in the transmission path proximal of the focal zone. The method further includes, if the reflected portion is received at the transducer within the certain time period, analyzing the received reflected portion to determine one or more characteristics of the disturbance.

The Office Action states that Seale teaches all the features of claim 1, and cites Seale col. 5, lines 14-28, and col. 14, line 12 - col. 16, line 55. Applicants respectfully disagree with the assertion that these passages teach the limitations recited in Claim 1. In particular, while Seale teaches an outgoing ultrasound pulse and returning ultrasound echoes, Seale does not teach “detecting whether a reflected portion of the ultrasound energy burst is received at the transducer within a certain time period following transmission of the burst,” as recited in claim 1.

Furthermore, Seale teaches only that “target and/or sensor position and orientation vary over time, demanding dynamic correction of the ultrasound beam path.” Seale does not teach detecting, or correcting for, any other issues. In contrast, claim 1 of the present invention recites the limitation “receipt within the time period indicates the reflected portion was reflected by a disturbance located in the transmission path proximal of the focal zone.”

In addition, Seale teaches only that “in a tracking modality, a time-varying parameter such as flow velocity is to be determined.” The time-varying parameters taught by Seale are parameters of the target tissue volume, such as flow velocity in the target tissue. Seale does not teach or suggest detecting a disturbance, or determining characteristics of a disturbance. In contrast, claim 1 recites the limitations of “analyzing the received reflected portion to determine one or more characteristics of the disturbance.”

Thus, the passages of Seale cited in the Office Action do not teach or suggest a method for sensing a disturbance in a transmission path of a converging ultrasound energy beam transmitted by a transducer in a focused ultrasound system, including transmitting a burst of ultrasound energy from the transducer, along the transmission

Dkt No. 2024736-7015112001
(266/083)

path, to a focal zone, detecting whether a reflected portion of the ultrasound energy burst is received at the transducer within a certain time period following transmission of the burst, wherein receipt within the time period indicates the reflected portion was reflected by a disturbance located in the transmission path proximal of the focal zone, and, if the reflected portion is received at the transducer within the certain time period, analyzing the received reflected portion to determine one or more characteristics of the disturbance, as recited in claim 1. Therefore, claim 1 is patentable over the art of record, and withdrawal of the rejection of claim 1 is respectfully requested.

Claim 17 recites similar language to claim 1 and is patentable for the reasons discussed above with reference to claim 1. Accordingly, withdrawal of the rejection of claim 17 is respectfully requested.

Claims 2-16 and 18-38 are dependent on claims 1 and 17, respectively, and are patentable for at least those reasons discussed above with reference to claims 1 and 17. Accordingly, withdrawal of the rejection of claims 2-16 and 18-38 is respectfully requested.

Dkt No. 2024736-7015112001
(266/083)

CONCLUSION

In view of the foregoing comments, withdrawal of the rejection and the prompt issuance of a Notice of Allowance are respectfully solicited. If the Examiner feels that prosecution would be expedited by a telephone conversation, he is encouraged to contact Applicants' representative at the number listed below.

The commissioner is hereby authorized to charge any fee deficiency, or credit any overpayment, to Account No. 50-2518, referencing Attorney Docket No. 7015112001.

DATE: 12/16/05

Respectfully submitted,

By: 

Sarah E. Stahnke

Reg. No. 54,854

Bingham McCutchen LLP
Three Embarcadero Center, Suite 1800
San Francisco, California 94111
Telephone: (650) 849-4824
Telefax: (650) 849-4800